FUEL SUPPLY SYSTEM COMPONENTS, REMOVING AND INSTALLING

NOTE:

- **Hose connections are secured with either spring-type or clamp-type clips.**
- **Always replace clamp-type clips with screw-type clips.**
- **Fuel hoses in engine compartment must only be secured with spring-type clips. The use of clamp or screw-type clips is not permissible.**
- **Assembly tool VAS 5024 or hose clip pliers VAG 1921 are recommended for installing spring-type clips.**

- Observe safety precautions. See **SAFETY PRECAUTIONS WHEN WORKING ON FUEL SUPPLY SYSTEM** .
- Observe rules for cleanliness. See **RULES OF CLEANLINESS** .

Removing and installing fuel tank with its attachments and fuel filter. See **FUEL TANK WITH ATTACHMENTS AND FUEL FILTER, REMOVING AND INSTALLING** .

Observe crash fuel shut-off. See **CRASH FUEL SHUT-OFF** .

Electronic Engine Power Control (EPC) system, checking. See **ELECTRONIC ENGINE POWER CONTROL (EPC) SYSTEM COMPONENTS, CHECKING** .

Servicing parts of the Evaporative Emission (EVAP) system. See **EVAPORATIVE EMISSION (EVAP) SYSTEM COMPONENTS, SERVICING** .

FUEL TANK WITH ATTACHMENTS AND FUEL FILTER, REMOVING AND INSTALLING

NOTE: The following list refers to items in Fig. 1 .

1. **Sealing cap**
   - Secured with strap from MY 2000
2. **Seal**
   - Replace if damaged
3. **Securing screw**
4. **Tank flap unit**
   - With rubber cup
5. **Vent pipe**
   - Black
   - Check securely seated

- Clipped onto top of fuel tank

6. **Ground connection**
   - Check securely seated
7. **Vent pipe**
   - White
   - Check securely seated
   - Checking. See **Checking Change-Over Valve**
8. **Gravity/overflow valve**
   - To remove valve unclip upward out of support
   - Check valve for throughflow:
     - Valve vertical: open
     - Valve tilted 45°: closed
9. **O-ring**
   - Replace if damaged
10. **Change-over valve**
    - To remove valve, unclip sideways out of support.
    - Before installing remove sealing cap item 1.
    - Checking. See **Checking Change-Over Valve**
11. **Vent pipe**
    - Black
    - Check securely seated
    - To EVAP canister. See **EVAPORATIVE EMISSION (EVAP) SYSTEM, OVERVIEW** , Pos.6
    - To remove from flange, press release button on connecting piece.
12. **Pressure retaining valve**
    - For fuel tank breathing
    - Checking. See **Checking Pressure Retaining Valve**
13. **Vent pipe**
    - Black
    - Check securely seated
    - Secure with spring-type clips
14. **Fuel tank**
    - Support with engine and transmission jack VAG 1383 A when removing
    - Removing and installing. See **FUEL TANK, REMOVING AND INSTALLING**
15. **Clamping washer**
16. **Heat shield**
    - For fuel tank
17. **25 N.m**

18. **Lock nut, 2 N.m**
19. Fuel tank cover
20. Securing strap
    - Note differing length
    - Installation position: Fixing point (holes) point in direction of travel
21. **Supply pipe**
    - Black
    - Check securely seated
    - Press disengaging tabs at connecting piece to pull off fuel filter
    - To fuel supply hose on fuel rail:

      See Fuel Rail With Injectors, Disassembling And Assembling .

22. **Fuel filter**
    - Installation position: -arrow- points in throughflow direction
23. **Screw-type clip**
24. **Vent pipe**
    - White
    - Check securely seated
    - Clipped onto side of fuel tank
    - To EVAP Canister Purge Regulator Valve -N80-
25. **Sealing ring**
    - Replace if damaged
    - When installing, insert seal "dry" into fuel tank opening
    - Only coat with fuel when installing fuel delivery unit flange
26. **Fuel delivery unit**
    - Note installation position on fuel tank. See **Installation Position Of Fuel Delivery Unit Flange**
    - Removing and installing. See **FUEL DELIVERY UNIT, REMOVING AND INSTALLING**
    - Removing and installing fuel gauge sensor. See **FUEL GAUGE SENSOR, REMOVING AND INSTALLING**
    - Checking fuel pump. See **FUEL PUMP, CHECKING**
    - Clean strainer if soiled
27. **Union nut, 75 N.m**
    - Remove and install with spanner 3217
28. **Supply pipe**
    - Black
    - Check securely seated
    - Clipped onto side of fuel tank

- To remove from flange and fuel filter press release button on connecting piece

29. **Return pipe**
    - Blue or blue markings
    - Clipped onto side of fuel tank
    - Check securely seated
    - To remove from flange press release button on connecting piece
    - From fuel return pipe on fuel rail

    See Fuel Rail With Injectors, Disassembling And Assembling .

30. **Connector**
    - Black, 4-pin
    - For Fuel Gauge sensor -G- and Fuel Pump -G6-
31. **10 N.m**

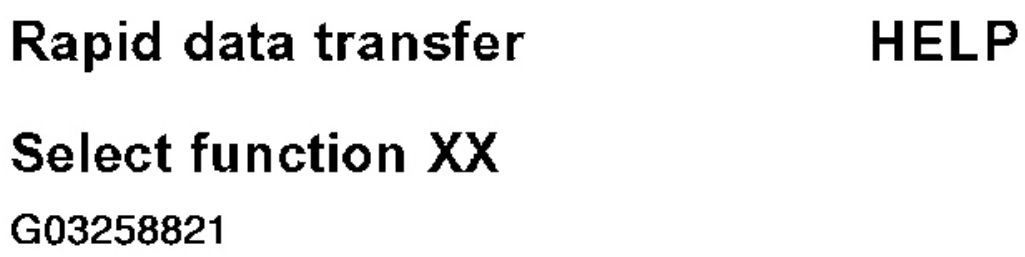

Fig. 1: Exploded View Of Fuel Supply System Components
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Installation Position Of Fuel Delivery Unit Flange

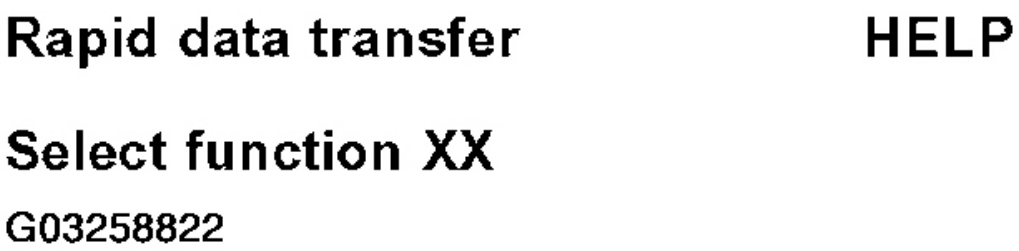

Fig. 2: Identifying Installation Position Of Fuel Delivery Unit Flange
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Marking on sensor must align with the marking on fuel tank -arrows-.

Blue or blue marked return pipe -1- to connection with identification -R-.

Black supply pipe -2- to connection with identification -V-.

NOTE: After installing fuel delivery unit flange, check that the supply, return and breather pipes are still clipped onto the fuel tank.

Checking Change-Over Valve

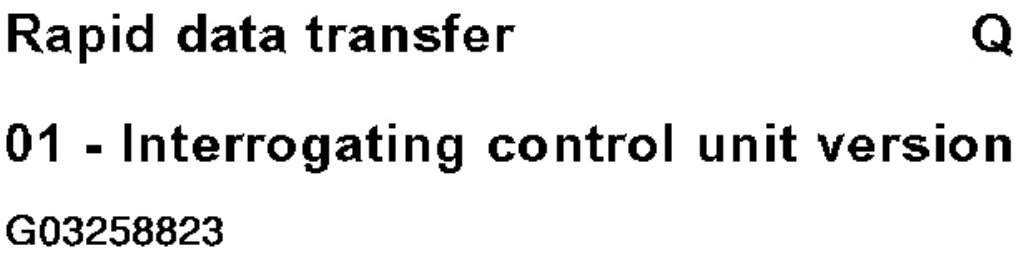

Fig. 3: Checking Change-Over Valve
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Valve in rest position: Closed

Valve pushed in direction of arrow: Open

NOTE: Before installing change-over valve, unscrew cap from fuel tank.

Checking Pressure Retaining Valve

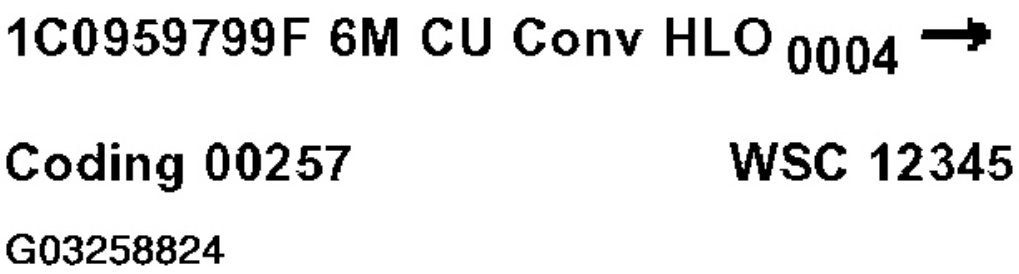

Fig. 4: Checking Pressure Retaining Valve
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Pressure retaining valve is open from EVAP canister and from Evaporative Emission (EVAP) Canister Purge Regulator Valve -N80- in both flow directions -arrow- -1-.

From gravity valve side, it is only open in one flow direction -arrow- -2-.

SAFETY PRECAUTIONS WHEN WORKING ON FUEL SUPPLY SYSTEM

CAUTION: When doing any repair work, especially in the engine compartment, due to the cramped conditions, pay attention to the following:

- Route all sorts of hoses/lines (e.g. for fuel, hydraulics, evaporative emissions system, coolant, refrigerant, brake fluid and vacuum lines and hoses) and electrical wiring so that the original positions are restored.
- Make sure sufficient clearance to all moving or hot components.

WARNING: Fuel supply hoses are under pressure! Before removing from hose connection wrap a cloth around the connection. Then release pressure by carefully pulling hose off connection.

When removing and installing the fuel gauge sensor or fuel pump (fuel delivery unit) from a full or partly full fuel tank the following must be observed:

- Before commencing work, switch on exhaust extraction system and place an extraction hose close to the

sensor opening in the fuel tank to extract escaping gas fumes. If no exhaust extraction system is available, a radial fan (as long as motor is not in air flow) with a displacement greater than 15 m^3 /h can be used.

- Prevent skin contact with gasoline! Wear fuel resistant gloves!
- For safety reasons, remove fuse 28 from fuse holder before opening fuel system because fuel pump can be activated via driver side door contact switch.

Fig. 5: Identifying Location Of Fuse 28
Courtesy of VOLKSWAGEN OF AMERICA, INC.

NOTE: Fuse box is located behind access panel at far left end of dash.

RULES OF CLEANLINESS

When working on the fuel supply/injection system, pay careful attention to the following 5 rules:

- Thoroughly clean all unions and the adjacent areas before disconnecting.
- Place parts that have been removed on a clean surface and cover. Do not use fluffy cloths!
- Carefully cover opened components or seal, if the repair cannot be carried out immediately.
- Only install clean components: only unpack replacement parts immediately prior to installation. Do not use parts that have been stored loose (e.g. in tool boxes etc.).
- When the system is open: Do not work with compressed air if this can be avoided. Do not move vehicle unless absolutely necessary.

FUEL DELIVERY UNIT, REMOVING AND INSTALLING

Special tools and equipment

- VAG 1332 Torque wrench (40-200 N.m)

Fig. 6: Identifying VAG 1332 Torque Wrench (40-200 N.m)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- 3217 Ring nut wrench

Fig. 7: Identifying 3217 Ring Nut Wrench
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Removing

- Note safety precautions before starting work. See **SAFETY PRECAUTIONS WHEN WORKING ON FUEL SUPPLY SYSTEM** .
- Check whether a coded radio is installed. If so, obtain anti-theft coding.
- With ignition switched off disconnect battery Ground strap.
- Remove cover under bench seat.
- Pull 4-pin connector and supply and return pipes off flange.

> **WARNING: Fuel supply hoses are under pressure! Before removing from hose connection wrap a cloth around the connection. Then release pressure by carefully pulling hose off connection.**

- Remove union nut with 3217 wrench.

1Y1959802A Door control unit FPS KLO 0001 →

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Fig. 8: Removing Union Nut With 3217 Wrench
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Pull fuel delivery unit and seal out of opening in fuel tank.

NOTE: If the delivery unit is to be replaced then drain old delivery unit before disposal.

Installing

Installing the fuel delivery unit is carried out in the reverse order.

NOTE:

- **When inserting the fuel delivery unit make sure that the fuel gauge sensor is not bent.**
- **Insert flange seal of fuel delivery unit into the fuel tank opening in dry condition.**
- **Only coat with fuel when installing fuel delivery unit flange.**
- **Ensure fuel hoses are seated securely.**
- **Secure fuel hoses with spring-type clamps.**
- **Note installation position of fuel delivery unit flange: the marking on flange must align with marking on fuel tank -arrows-.**

Please wait

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Fig. 9: Aligning Marking On Flange With Marking On Fuel Tank

Courtesy of VOLKSWAGEN OF AMERICA, INC.

- **After installing fuel delivery unit, check that the supply, return and vent pipes are still clipped onto fuel tank.**

- Perform work sequence "Procedure after voltage supply open circuit".

  See Procedure After Correcting Voltage Supply Open Circuit .

- Check DTC memory and read readiness code:

  See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing .

- Match engine electronics control module to throttle valve control module:

  See Engine Control Module (ECM) To Throttle Valve Control Module, Adapting .

FUEL GAUGE SENSOR, REMOVING AND INSTALLING

Removing

- Remove fuel delivery unit. See **RULES OF CLEANLINESS** .
- Release and pull off terminals for wires -3- and -4-.

Fig. 10: Pulling Off Terminals For Wires -3- And -4-
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Lift retaining tabs -1- and -2- with a screwdriver and pull fuel gauge sensor out downward -arrows-.

Installing

- Insert fuel gauge sensor in guides on fuel delivery unit and push up until it engages.

FUEL TANK, REMOVING AND INSTALLING

Special tools and equipment

- VAG 1383 A Engine/transmission jack

Fig. 11: Identifying VAG 1383 Engine/Transmission Jack
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- VAG 1331 Toque wrench (5-50 N.m)

Fig. 12: Identifying VAG 1331 Toque Wrench (5-50 N.m)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Removing

- Note safety precautions before starting work. See **SAFETY PRECAUTIONS WHEN WORKING ON FUEL SUPPLY SYSTEM** .
- First check whether a coded radio is installed. If so, obtain anti-theft coding.
- With ignition switched off disconnect battery Ground strap.
- Open fuel flap.
- Remove rear right wheel housing liner.

  See **REAR WHEEL HOUSINGS LINER, ASSEMBLY OVERVIEW**

- Remove rear axle.

See **AXLE BEAM**

- Drain fuel tank and clean fuel filler neck and surrounding area.
- Unscrew securing bolts and remove tank flap unit with rubber cup.
- Remove securing bolt on filler neck.
- Fold rear seat bench forward.
- Remove fuel gauge sensor cover plate and disconnect connector.
- Remove cover from under fuel tank.

WARNING: Fuel supply hoses are under pressure! Before removing from hose connection wrap a cloth around the connection. Then release pressure by carefully pulling hose off connection.

- Disconnect return hose -2- (blue), supply hose -1- (black) and breather hose -3- (white) at connecting point.

NOTE: Press buttons on hose couplings to do this.

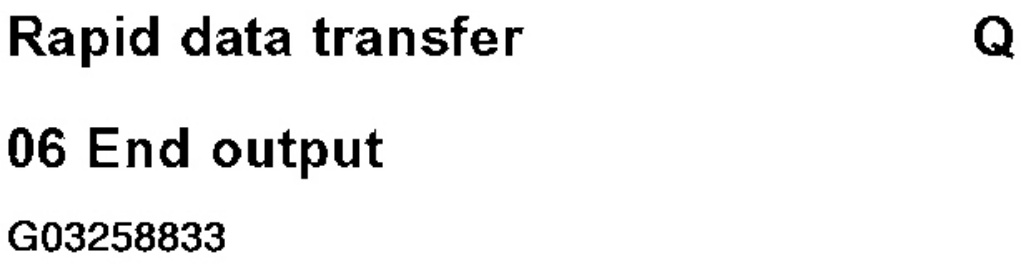

Fig. 13: Disconnecting Return Hose, Supply Hose And Breather Hose At Connecting Point
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Remove tensioning strap. When doing this support fuel tank with engine/transmission jack VAG 1383 A.
- Lower fuel tank.

Installing

Installation is carried out in the reverse order; when doing this note the following:

- Breather hoses are to be installed kink-free.
- Fuel hoses are to be installed kink-free.

- Make sure fuel hoses are seated securely.
- Secure fuel hoses with spring-type clamps.
- Do not interchange supply and return hose (return hose blue or blue markings, supply hose black).

NOTE: After installing the fuel gauge sensor, check that the supply, return and breather pipes are still clipped onto the fuel tank.

- Check DTC memory.

  See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing .

- Read readiness code.

  See Readiness Code, Displaying .

- Match engine electronics control module to throttle valve control module.

  See Engine Control Module (ECM) To Throttle Valve Control Module, Adapting .

REPLACEMENT FUEL TANKS, INSTALLING GROUND STRAP

Condition

All replacement fuel tanks do not come with ground strap (wire) installed.

Installing

NOTE: The ground strap must be installed into all replacement fuel tanks.

CAUTION: Part numbers are for reference only. Always check with your Parts Dept. for the latest parts information.

Install ground strap Part No. 1 J0 201 184 into replacement fuel tank as follows:

- Remove fuel filler cap and observe cautions printed on cap.
- Bend up tab on inside of fuel filler pipe as shown -arrow-.

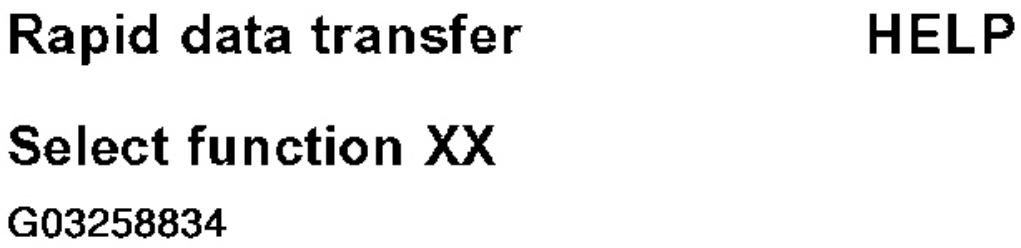

Fig. 14: Bending Up Tab On Inside Of Fuel Filler Pipe
Courtesy of VOLKSWAGEN OF AMERICA, INC.

NOTE: Illustration shows ground strap already installed.

- Insert end -A- of ground strap through slot in tab up to bend -B- at other end of strap.

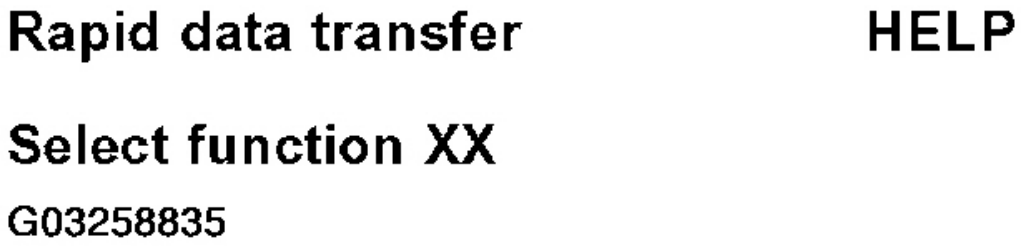

Fig. 15: Inserting End -A- Of Ground Strap Through Slot In Tab Up To Bend -B- At Other End Of Strap
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Bend down tab on inside of fuel filler pipe. This will secure strap to end of tab.
- Reinstall fuel filler cap.

CRASH FUEL SHUT-OFF

Function

Vehicles with an airbag are equipped with a crash fuel shut-off system. It reduces the danger of a fire in a crash

as the fuel pump is switched off via the fuel pump relay.

Simultaneously this system provides an improved start for the engine. When the door is opened the fuel pump is activated for 2 seconds to build-up the pressure in fuel system.

When opening the fuel system:

Observe safety precautions. See **SAFETY PRECAUTIONS WHEN WORKING ON FUEL SUPPLY SYSTEM** .

- Check activation of fuel pump relay using wiring diagram and VAG1466 A:

  See appropriate WIRING DIAGRAM article

FUEL PUMP, CHECKING

Special tools and equipment

- 3217 Ring nut wrench
- VAG 1348/3A Remote control with VAG 1348/3-2 adapter cable
- VAG 1466 Test system
- VAG 1527 BLED test light
- VAG 1594 A Adapter set
- VAG 1715 Multimeter

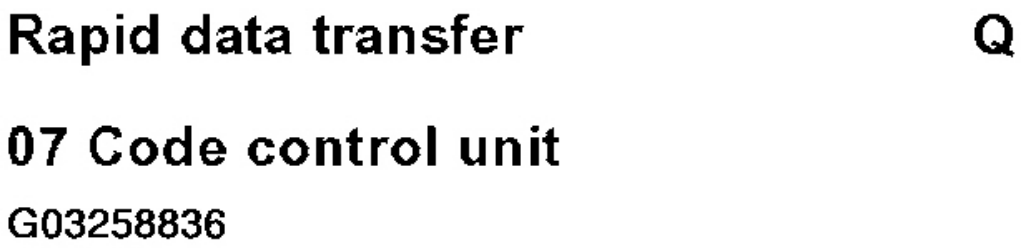

Fig. 16: Identifying Special Tools And Equipment (1 Of 2)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- VAG 1318 Pressure tester
- VAG 1318/1 Adapter
- VAG 1318/11 Adapter

- VAG 1318/17 Adapter
- VAG 1318/23 Adapter
- VAG 1332 Torque wrench (40-200 N.m)
- Measuring container
- Wiring diagram

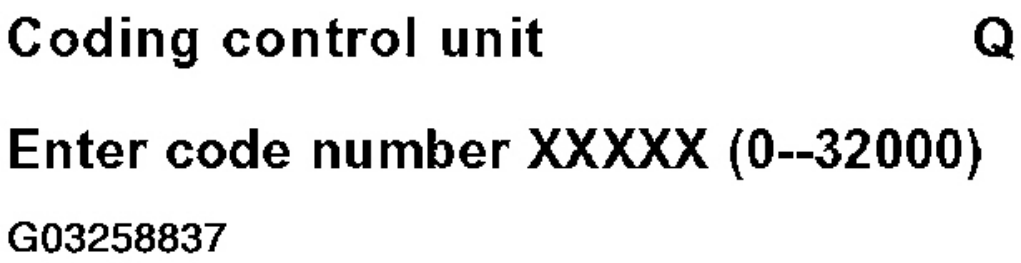

Fig. 17: Identifying Special Tools And Equipment (2 Of 2)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Test conditions

- Battery voltage at least 11.5 V
- Fuse No. 28 OK

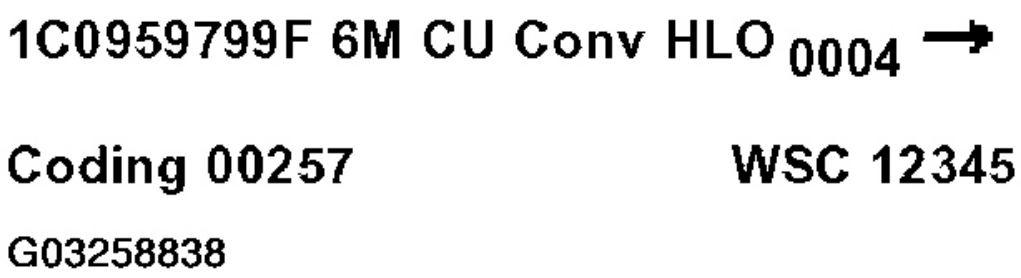

Fig. 18: Identifying Location Of Fuse No. 28
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- All electrical consumers, e.g. lights and rear window defroster must be switched off.

- If the vehicle is equipped with an air conditioner, this must be switched off.

NOTE: Observe description of function of crash fuel shut-off. See CRASH FUEL SHUT-OFF .

Checking function and voltage supply

NOTE: Check whether a coded radio is installed as during the forthcoming work sequences the battery Ground strap must be disconnected. Obtain radio code first if necessary.

- Remove cover from fuel delivery unit.
- Briefly operate starter.

  Fuel pump must be heard to run.

- Switch ignition off.

If the fuel pump does not run:

- Remove cover in front of fuse holder.
- Pull fuse No. 28 out of fuse holder.

Fig. 19: Connecting Remote Control VAG 1348/3A With Adapter Cable VAG 1348/3-2 To Terminal 28A
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Connect remote control VAG 1348/3A with adapter cable VAG 1348/3-2 to terminal 28a to fuel pump and battery positive (+).
- Operate remote control.

Fuel pump runs:

- Check activation of fuel pump relay using wiring diagram:

  See appropriate WIRING DIAGRAM article

Fuel pump does not run:

- Pull 4 pin connector off flange on fuel delivery unit.
- Connect LED test light VAG 1527 B with auxiliary cables from VAG 1594 A to outer terminals of connector.

Fig. 20: Connecting LED Test Light VAG 1527 B With Auxiliary Cables From VAG 1594 A To Outer Terminals Of Connector
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Operate remote control.

  LED must light up

LED does not light up:

- Locate and eliminate open circuit using wiring diagram:

See appropriate WIRING DIAGRAM article

LED lights up (voltage supply OK.):

- Remove union nut with 3217 wrench.

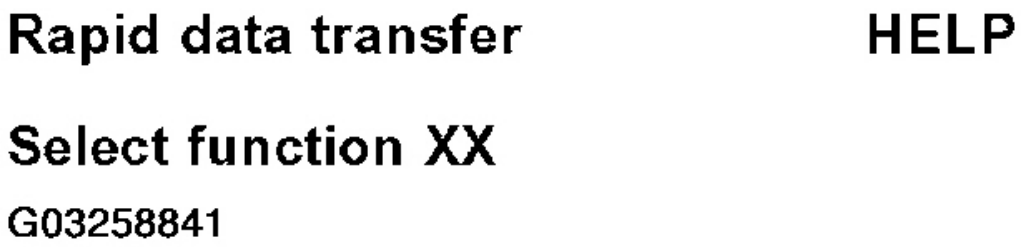

Fig. 21: Removing Union Nut With 3217 Wrench
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Check that electrical wires between flange and fuel pump are connected.

If no open circuit can be found:

- Fuel pump malfunctioning, replace fuel delivery unit. See **RULES OF CLEANLINESS** .

Checking delivery rate

Test conditions

- Voltage supply OK
- Remote control VAG 1348/3A connected

Test sequence

- Remove filler cap from fuel tank filler neck.

> **WARNING: Fuel system is under pressure! Before opening the system place a cloth around the connection. Then release pressure by carefully loosening the connection.**

- Pull off supply pipe/hose -1- and collect leaking fuel with a cloth.

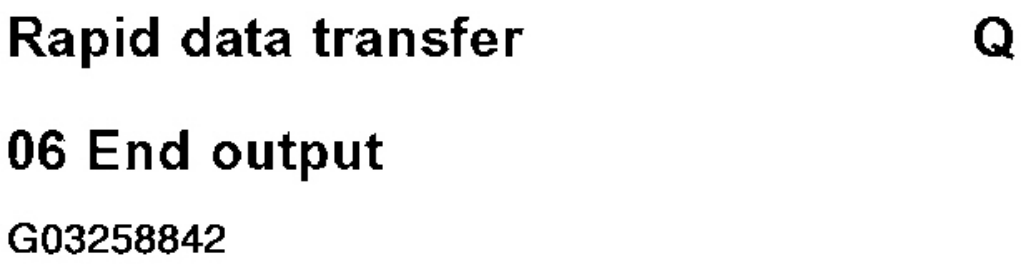

Fig. 22: Pulling Off Supply Pipe/Hose
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Connect pressure gauge VAG 1318 with adapter 1318/23 and VAG 1318/17 to fuel supply hose.

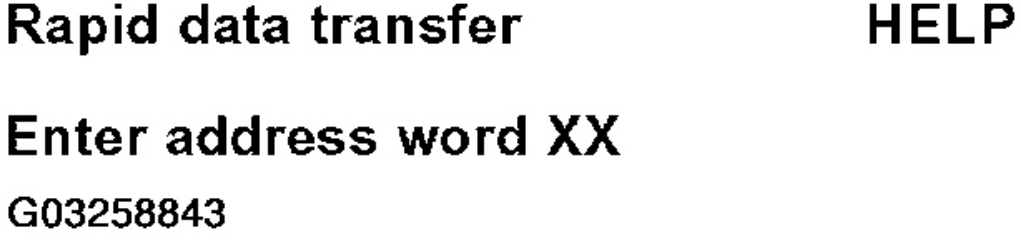

Fig. 23: Connecting Pressure Gauge VAG 1318 With Adapter 1318/23 And VAG 1318/17 To Fuel Supply Hose
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Push hose VAG 1318/1 onto adapter VAG 1318/11 on pressure gauge and hold hose in a measuring container.
- Open pressure gauge cut-off tap. Lever then points in throughflow direction -A-.
- Operate remote control VAG 1348/3A and slowly close cut-off tap, until pressure gauge shows 3 bar. From this point on do not move position of cut-off tap.
- Empty measuring container.
- Fuel pump delivery range is dependent upon battery voltage. Therefore, connect multimeter with adapter cables from VAG 1594A to vehicle battery.
- Operate remote control for 30 seconds and measure battery voltage.

- Compare quantity of fuel delivered with specification.

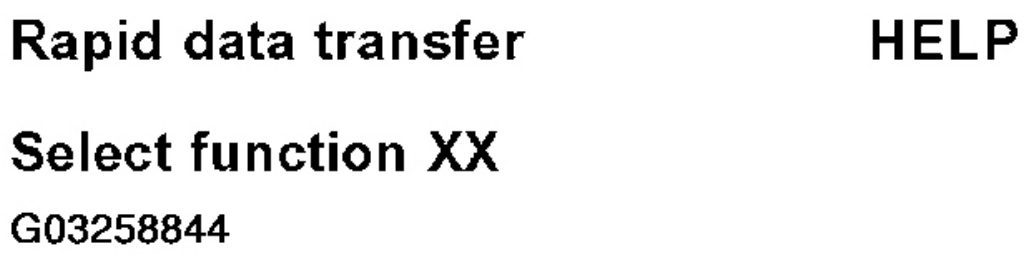

Fig. 24: Minimum Delivery V/S Voltage Graph
Courtesy of VOLKSWAGEN OF AMERICA, INC.

*) Minimum delivery cm^3 /30 seconds

**) Voltage at fuel pump with engine stationary and pump running (approx. 2 volts less than battery voltage).

Example:

During the test a voltage of 12.5 volts is measured at the battery. As the voltage at the pump is approx. 2 volts less than the battery voltage then this will equate to a minimum delivery of 200 cm^3 /30 s.

If the minimum delivery rate is not attained:

- Check fuel lines for possible restrictions (kinks) or blockages.
- Pull supply hose off fuel filter inlet.
- Connect pressure gauge VAG 1318 with adapter 1318/17 to fuel supply hose.

Fig. 25: Connecting Pressure Gauge VAG 1318 With Adapter 1318/17 To Fuel Supply Hose
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Repeat delivery rate check.

If the minimum delivery rate is now attained:

- Replace fuel filter.

If the minimum delivery rate is again not attained:

- Remove fuel delivery unit and check strainer filter for soiling.

  Only when up to now no malfunction has been detected:

- Fuel pump malfunctioning, replace fuel delivery unit. See **FUEL DELIVERY UNIT, REMOVING AND INSTALLING** .
- Check DTC memory:

  See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing .

- Read readiness code:

  See Readiness Code, Displaying .

  If the DTC memory has been erased or the Engine Control Module separated from the permanent (battery) positive, the readiness code must be generated again.

  See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing .

  If the delivery rate has been attained but nevertheless a fuel supply system malfunction is suspected (e.g. intermittent failure of fuel supply system), check the current draw of the fuel pump as follows:

- Reconnect all disconnected fuel hoses.
- Connect multimeter VAG 1715 to wire -arrow- for terminal 1 of 4-pin connector using pick-up clamp.

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Fig. 26: Connecting Multimeter VAG 1715 To Wire For Terminal 1 Of 4-Pin Connector Using Pick-Up Clamp
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Start engine and run at idling speed.
- Measure current draw of fuel pump.

  Specification: max. 8 amps.

NOTE: If the fuel system malfunction is intermittent, you can perform the check during a test drive, to do this a 2nd person is necessary.

Observe the valid safety precautions when performing a road test.

See Safety Precautions .

If the current draw is exceeded:

- Fuel pump malfunctioning, replace fuel delivery unit. See **FUEL DELIVERY UNIT, REMOVING AND INSTALLING** .
- Check DTC memory:

  See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing .

- Read readiness code:

  See Readiness Code, Displaying .

If the DTC memory has been erased or the Engine Control Module separated from the permanent (battery) positive, the readiness code must be generated again.

See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing .

Checking fuel pump non-return valve

Test conditions

- Remote control VAG 1348/3A is still connected
- Pressure gauge VAG 1318 is still connected

Test sequence

NOTE: With this check the fuel supply line connections from the fuel delivery unit to the point at which the pressure gauge VAG 1318 is connected will be checked for leaks at the same time.

- Close pressure gauge cut-off tap (lever at right angles to throughflow direction - position -B-).

Fig. 27: Closing Pressure Gauge Cut-Off Tap (Lever At Right Angles To Throughflow Direction - Position -B-)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Separate remote control at short intervals, until a pressure of approx. 3 bar has built up.

WARNING: Danger of spray when opening the cut-off tap, hold container over the pressure gauge free connection.

- If pressure builds up too high, lower excess pressure by carefully opening cut-off tap.
- Watch pressure drop on gauge. After 10 minutes pressure must not drop below 2.5 bar.

If the pressure drops further:

- Check line connections for leaks.

If no wiring malfunction is detected:

- Fuel pump malfunctioning, replace fuel delivery unit. See **FUEL DELIVERY UNIT, REMOVING AND INSTALLING**
- Check DTC memory:

  See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing .

- Read readiness code:

See Readiness Code, Displaying in ENGINE PERFORMANCE.

If the DTC memory has been erased or the Engine Control Module separated from the permanent positive, the readiness code must be generated again.

See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing in ENGINE PERFORMANCE.

ELECTRONIC POWER CONTROL (EPC) SYSTEM

EPC SYSTEM, FUNCTION

With the EPC system the throttle valve is not operated by a cable. There is no mechanical connection between accelerator and throttle valve.

The position of the accelerator is transmitted to the Engine Control Module by two throttle position sensors (variable resistors together in a housing) which are connected to the accelerator pedal.

The position of the accelerator (drivers requirement) is the main input value for the Engine Control Module.

The throttle valve is operated over the complete revolution and load range by an electric motor (throttle valve positioner) in the throttle valve control part.

The throttle valve is operated by the throttle valve positioner which is controlled by the Engine Control Module.

When the engine is not running and the ignition is switched on the Engine Control Module moves the throttle valve exactly as prescribed by the throttle position sensor. This means that when the accelerator is depressed halfway the throttle valve positioner opens the throttle valve by the same amount, the throttle is then approximately half open.

When the engine is running (under load) the Engine Control Module can open or close the throttle valve independently of the throttle position sensor.

This means that the throttle valve can already be completely open even though the accelerator pedal is depressed half way.

This also gives vastly improved consumption and exhaust emission levels at certain load conditions.

The torque required by the engine can be produced by the Engine Control Module by optimizing the

combination of throttle valve cross-section and charge pressure.

It is incorrect to believe that the "EPC" is comprised of one or two components only. The EPC is a system, which is comprised of all components which have an influence, control or monitor the position of the throttle valve, e.g. the throttle position sensor, the throttle valve control module, the EPC warning lamp, the Engine Control Module.

Observe safety precautions. See **SAFETY PRECAUTIONS WHEN WORKING ON FUEL SUPPLY SYSTEM** .

Observe rules for cleanliness. See **RULES OF CLEANLINESS** .

ELECTRONIC ENGINE POWER CONTROL (EPC) SYSTEM COMPONENTS, CHECKING

NOTE: The following list refers to items in Fig. 28 .

1. **Bracket**
2. **Connector**
   - Black, 5 pin
3. **10 N.m**
4. **Throttle Position (TP) sensors -G79- and -G185-**
   - Not adjustable
   - Both sensors encompassed within one assembly
   - TP sensors -G79- and -G185- communicate driver's intentions to control module
   - To remove sensors, remove cover in footwell
   - When removing remove instrument panel and pedal cluster cover
   - Checking. See **THROTTLE POSITION (TP) SENSORS -G79- AND -G185-, CHECKING**
   - If replaced, adapt control module for automatic transmission using scan tool. See **BASIC SETTING, INITIATING** .
5. **Retainer**
   - For footwell cover
   - From Model Year 2002
   - Clipped onto accelerator pedal
6. **Bracket**
   - For cover in footwell
   - Through Model Year 2001
   - Clipped onto accelerator pedal

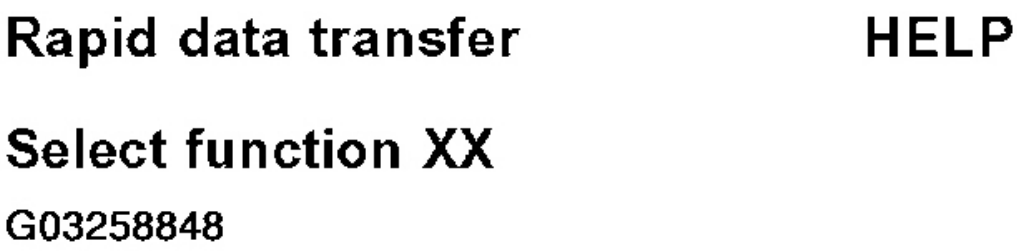


Fig. 28: Checking Components Of Electronic Engine Power Control System
Courtesy of VOLKSWAGEN OF AMERICA, INC.

ELECTRONIC ENGINE POWER CONTROL (EPC) WARNING LAMP IN INSTRUMENT CLUSTER, SIGNIFICANCE

"EPC" is the abbreviation for Electronic Engine Power Control.

When the ignition is switched on the Engine Control Module checks all components which are important for the correct functioning of the electronic engine power control.

If malfunctions are recognized in electronic power control system when the engine is running, the Engine Control Module will switch on the EPC lamp (these malfunctions are marked in the DTC table). Simultaneously an entry is made in the Engine Control Module DTC memory.

Location of EPC warning lamp

Fig. 29: Locating Electronic Engine Power Control Warning Lamp
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Checking function of warning lamp

See Electronic Power Control (EPC) Warning Lamp, Checking (Through MY 1999) or Electronic Power Control (EPC) Warning Lamp, Checking (From MY 2000) in ENGINE PERFORMANCE.

THROTTLE POSITION (TP) SENSORS -G79- AND -G185-, CHECKING

Special tools and equipment

- VAG 1526 Hand multimeter
- VAG 1551 Scan Tool (or VAG 1552 vehicle system tester with VAG 1551/3 cable)
- VAG 1594 A Adapter set
- VAG 1598/22 Test box
- Wiring diagram

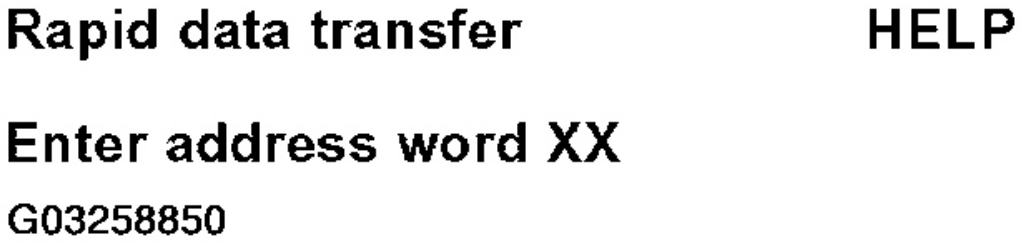


Fig. 30: Identifying Special Tools And Equipment
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Function

Both the Throttle Position (TP) sensors -G185-and -G79- are located at the accelerator pedal and communicate the driver's intentions to the Engine Control Module (ECM) fully independently of each other. Both are located in one housing.

Test conditions

- The fuses must be OK.
- The battery voltage must be at least 11.5 V.

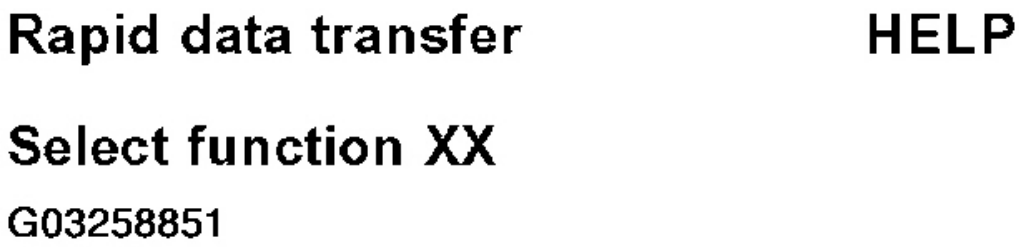


Fig. 31: Identifying Location Of Fuses
Courtesy of VOLKSWAGEN OF AMERICA, INC.

NOTE: Fuse box is located behind access panel at far left end of dash.

Test sequence

- Connect VAG 1551 Scan Tool (or VAG 1552 Scan Tool) and with ignition switched on select engine electronics with "Address word" 01:

See V.A.G 1551 Scan Tool, Connecting And Selecting Engine Control Module .

Indicated on display

- Press buttons -0- and -8- for function "Read Measured Value Block" and confirm entry with -Q- button.

Indicated on display

- Press buttons -0-, -6- and -2- for "Display group number 62" and confirm entry with -Q- button.

Indicated on display: (1...4 = Display zones)

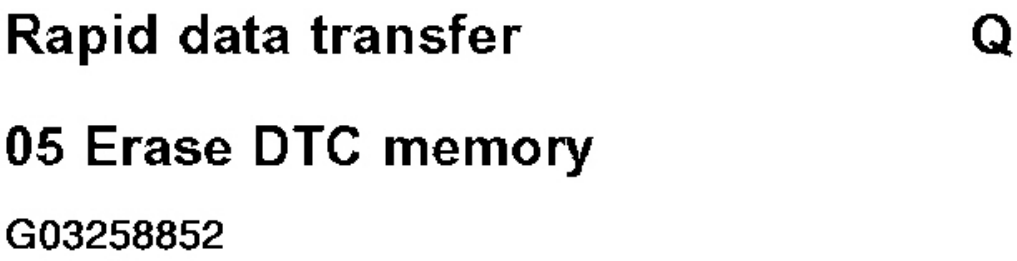


Fig. 32: V.A.G 1551 Scan Tool Display - Checking Throttle Position Sensor
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Check specification of TP sensor -G79- at idling stop in display zone 3.

  Specification: 6 to 96%

- Check specification of Throttle Position (TP) sensor -G185- at idling stop in display zone 4.

  Specification: 3 to 48%

NOTE: The Engine Control Module (ECM) calculates the voltage value of the angle sensor in percent relative to 5 volts and displays this value (5 volts supply voltage represents 100%).

- Operate accelerator pedal slowly until Wide Open Throttle and observe the angle indication in display fields 3 and 4:

  The percent indication in display field 3 must rise evenly. Specified range of 6 to 96% will not be used in it's entirety.

  The percent figures in display zone 4 must rise evenly. The tolerance range of 3 to 48% is not covered completely.

  NOTE: The indicated value in display field 3 must always be approximately twice as large as the value in display field 4.

- Press --> button.
- Press buttons -0- and -6- for function "End output" and confirm entry with -Q- button.
- Switch ignition off.

If the display does not indicate as described:

- Check voltage supply and wiring connections of Throttle Position (TP) sensor -G185- and -G79-. See **CHECKING VOLTAGE SUPPLY AND WIRING TO CONTROL MODULE** .

Checking voltage supply and wiring to control module

- Remove driver side storage compartment

  See **GLOVE BOX, REMOVING AND INSTALLING**

- Disconnect 6-pin connector for Throttle Position (TP) sensors -G79- and -G185-.
- Switch ignition on.
- Connect multimeter for voltage measurement at following terminals of connector using adapter cables from VAG 1594 A.

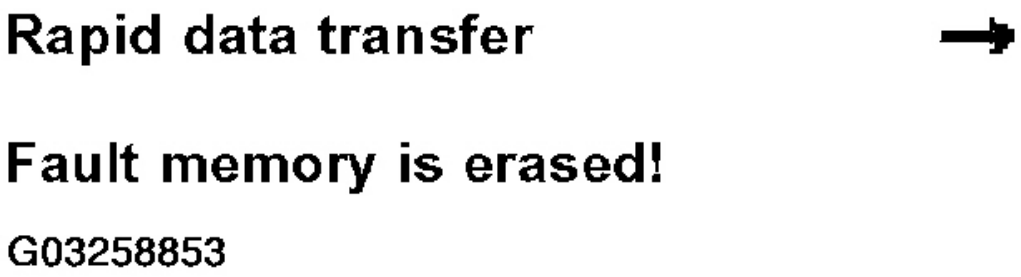


Fig. 33: Connecting Multimeter For Voltage Measurement Terminals Of Connector Using Adapter Cables From VAG 1594 A
Courtesy of VOLKSWAGEN OF AMERICA, INC.

  - Contact 1 + Ground (GND)
  - Terminal 1 + 5
  - Terminal 2 + Ground (GND)
  - Terminal 2 + 3
  - Specified value at least 4.5 V
- Switch ignition off.

If the specifications are not obtained:

- Remove inner plenum chamber cover, left:

  See **PLENUM CHAMBER INNER COVER, REMOVING AND INSTALLING**

- Connect test box VAG 1598/31 to control module wiring harness. Engine Control Module is not connected by this action.

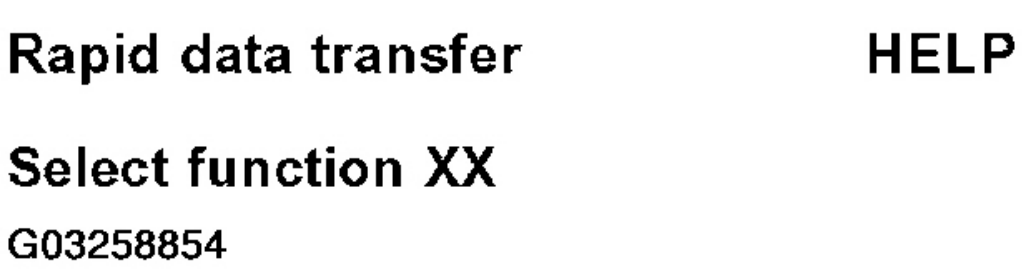


Fig. 34: Connecting Test Box VAG 1598/31 To Control Module Wiring Harness
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Check wiring between test box and connector for open circuit according to wiring diagram.

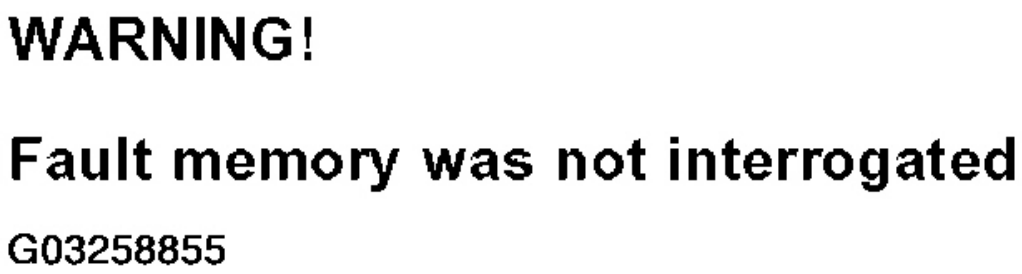


Fig. 35: Identifying Connector Terminals
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Contact 1 + socket 72
- Contact 2 + socket 73
- Contact 3 + socket 36
- Contact 4 + socket 35
- Contact 6 + socket 34

Vehicles with automatic transmission:

- Contact 5 + socket 33
- Wire resistance: max. 1.5 ohms

- Additionally check wiring for short to battery positive or Ground.
- Additionally check wires for short to one another.

If no wiring malfunction is detected:

- Replace Throttle Position (TP) sensors -G79- and -G185-. See **ELECTRONIC ENGINE POWER CONTROL (EPC) WARNING LAMP IN INSTRUMENT CLUSTER, SIGNIFICANCE** , item 4.

Vehicles with automatic transmission 01M

- Adapt control module for automatic transmission:

See **BASIC SETTING, INITIATING** .

Continued for all vehicles

- Check DTC memory:

See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing .

- Read readiness code:

See Readiness Code, Displaying .

If the DTC memory has been erased or the engine control module separated from the permanent positive, the readiness code must be generated again.

See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing .

EVAPORATIVE EMISSION (EVAP) SYSTEM

FUNCTIONAL DESCRIPTION OF LEAK DETECTION

Depending upon the air pressure and ambient temperature, fuel vapor will form above the level of fuel in the tank.

The Evaporative Emission (EVAP) system prevents these HC emission escaping to the atmosphere.

In limited quantities, fuel vapors pass through a gravity valve (which closes at an angle of 45°) located at the highest point in the tank and through a pressure retention valve into the activated charcoal filter in the EVAP canister.

The activated charcoal stores these vapors like a sponge.

When the oxygen sensor control is active when driving (engine warm), the EVAP canister purge regulator valve -N80- is activated (pulsed) from the Engine Control Module depending upon load and engine speed. The opening period is dependent on the input signals.

Intake manifold vacuum draws fresh air through the vent opening on the underside of the EVAP canister during the purging procedure (regenerating the activated charcoal). The fuel vapors stored in the activated charcoal and fresh air are pulse-fed for combustion.

The pressure retention valve prevents fuel vapors from being drawn from the tank when the solenoid valve is open and intake manifold vacuum is present. It therefore ensures that the evacuation of the EVAP canister has priority.

No voltage (e.g. wiring open circuit) the solenoid valve is closed and the EVAP canister will not be purged.

The vacuum line from the throttle valve control part to the EVAP canister has an additional by-pass which is connected with the crankcase breather valve. The non-return valve integrated in the crankcase breather valve prevents the intake air gassing into the crankcase during some partial load ranges. This improves the overall crankcase breathing. The by-pass guarantees the crankcase breathing.

Functional description of leak detection

The Evaporative Emission (EVAP) system (including fuel tank) is equipped with a leak detection which will detect whether the system is leaking.

The diagnosis operates by pressurizing the system and should detect leaks where the damage exceeds 1 mm in diameter.

During the diagnosis the Leak detection pump -V144- builds up a pressure of approx. 30 mbar in the Evaporative Emission (EVAP) system. The pump will switch off when the pressure is attained. When the pressure falls to below a certain figure, the pump will switch on again. The On Board Diagnostic monitors the time between the switched on periods, and if it is too short it will register a malfunction in the DTC memory.

NOTE:

- **Hose connections are secured with either spring-type or clamp-type clips.**
- **Always replace clamp-type clips with screw-type clips.**
- **Assembly tool VAS 5024 or hose clip pliers VAG 1921 are recommended for installing spring-type clips.**

- Observe safety precautions. See **SAFETY PRECAUTIONS WHEN WORKING ON FUEL SUPPLY SYSTEM** .
- Observe rules for cleanliness. See **RULES OF CLEANLINESS** .

Overview of EVAP canister system. See **EVAPORATIVE EMISSION (EVAP) SYSTEM, OVERVIEW** .

EVAPORATIVE EMISSION (EVAP) SYSTEM COMPONENTS, SERVICING

NOTE: The following list refers to items in Fig. 36 .

1. **Leak detection pump (LDP) -V144- */****
   - at EVAP canister
   - In right rear wheel well
   - Checking. See **LEAK DETECTION PUMP (LDP) -V144-, CHECKING**
2. **Connector**
   - 3 pin
3. **Vacuum pipe**
   - To throttle valve control module. See **EVAP CANISTER PURGE REGULATOR VALVE -N80-, CHECKING** , Pos. 15
   - Press together at front to release
4. **Vent pipe**
   - From changeover valve on fuel tank. See **CHECKING FUEL PUMP NON-RETURN VALVE** , item 10
5. **To Evaporative Emissions (EVAP) Canister Purge Regulator Valve -N80-**
   - In engine compartment, right at side piece. See **EVAP CANISTER PURGE REGULATOR VALVE -N80-, CHECKING** , Pos. 17
6. **EVAP canister**
   - In rear right wheel well behind wheel housing liner
7. **10 N.m**
8. **3 N.m**
9. **Air cleaner for leak detection pump**
10. **Connecting hose**
    - Suction side
11. **Connecting hose**
    - Pressure side

Rapid data transfer **Q**

06 End output

G03258856

Fig. 36: Identifying Evaporative Emission System Components
Courtesy of VOLKSWAGEN OF AMERICA, INC.

NOTE:

- **Components marked with an * are checked by the On Board Diagnostic (OBD). See Fig. 36 .**

  See On Board Diagnostic (OBD) .

- **Components marked with ** are checked by the Output Diagnostic Test Mode (DTM).**

  See Output Diagnostic Test Mode (DTM), Initiating .

EVAPORATIVE EMISSION (EVAP) SYSTEM, OVERVIEW

NOTE: The following list refers to items in Fig. 37 .

1. **Vacuum reservoir**
2. **Pressure retaining valve**
   - For fuel tank breathing
   - Checking. See **Checking Pressure Retaining Valve**
3. **Change-over valve**
   - Checking. See **Checking Change-Over Valve**
4. **EVAP canister**
   - In rear right wheel well behind wheel housing liner
5. **Leak detection pump (LDP) -V144-**
   - At EVAP canister
   - Checking activation:

     See Output Diagnostic Test Mode (DTM), Initiating

   - Checking. See **LEAK DETECTION PUMP (LDP) -V144-, CHECKING**
6. **Air cleaner for leak detection pump**
7. **Tank cap unit**
   - With rubber cup
8. **Fuel tank**
   - Support with engine and transmission jack VAG 1383 A when removing
   - Removing and installing. See **FUEL TANK, REMOVING AND INSTALLING**
9. **Fuel delivery unit**
   - Removing and installing. See **FUEL DELIVERY UNIT, REMOVING AND INSTALLING**
10. **Check-valve**

- Installation position: arrow points in direction of flow

11. **Intake pipe before turbocharger**
12. **Fuel pressure regulator**
13. **Fuel rail with injectors**
14. **Intake manifold upper part**
15. **Throttle valve control module -J338-**
16. **Fuel filter**
    - Installation position: Arrow points in throughflow direction
17. **EVAP canister purge regulator valve -N80- */****
    - In engine compartment at right about wheel housing
    - Checking activation:

      See Output Diagnostic Test Mode (DTM), Initiating

    - Checking function. See **EVAP CANISTER PURGE REGULATOR VALVE -N80-, CHECKING**
18. **Test connection**
19. **Gravity/overflow valve**

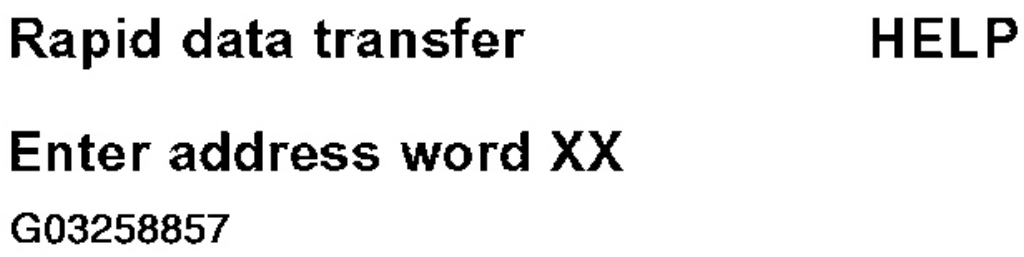


Fig. 37: Overview Of Evaporative Emission System
Courtesy of VOLKSWAGEN OF AMERICA, INC.

EVAP CANISTER PURGE REGULATOR VALVE -N80-, CHECKING

In a no-current situation the valve is closed.

Checking activation, Output Diagnostic Test Mode (DTM):

See Output Diagnostic Test Mode (DTM), Initiating

Special tools and equipment

- VAG 1551 Scan Tool

NOTE: The VAG 1552 vehicle system tester can be used instead of the VAG 1551 Scan Tool, however a print-out is not possible.

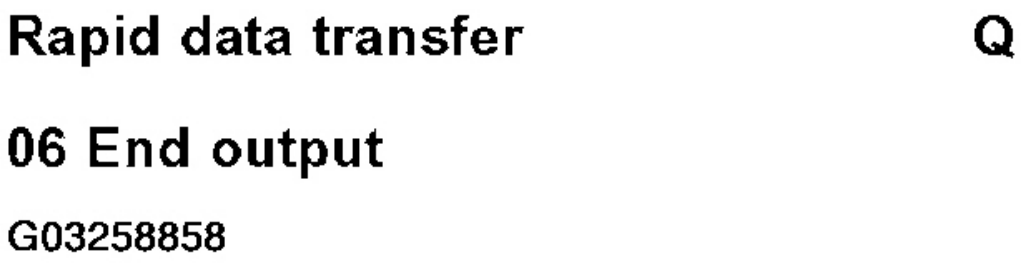


Fig. 38: Identifying VAG 1551 Scan Tool
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- VAG 1551/3 Cable

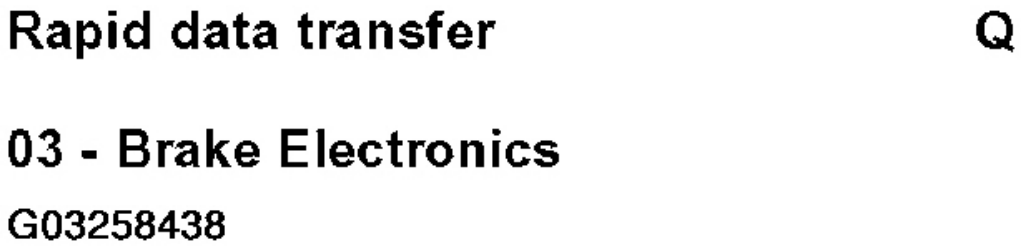


Fig. 39: Identifying VAG 1551/3 Cable
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Test conditions

- Fuse No. 43 must be OK

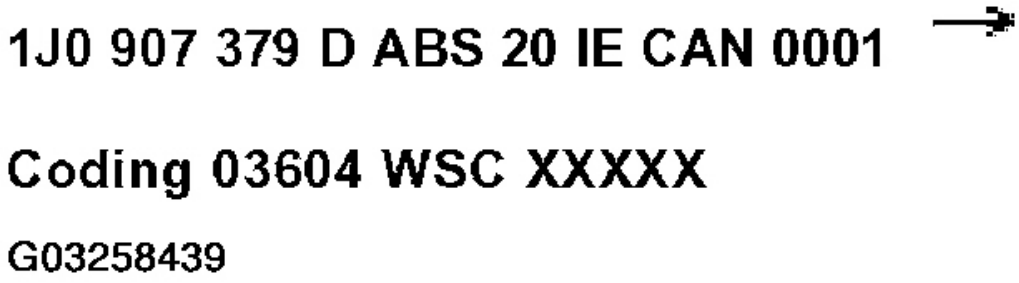


Fig. 40: Identifying Location Of Fuse No. 43
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Coolant temperature must be at least 85°C. See display group 04, display zone 3

NOTE: Fuse box is located behind access panel at far left end of dash.

Functional check

- Connect VAG 1551 Scan Tool (VAG 1552). Start engine and select Engine Control Module with "Address word" 01. Connecting scan tool and selecting Engine Control Module:

See V.A.G 1551 Scan Tool, Connecting And Selecting Engine Control Module

Indicated on display

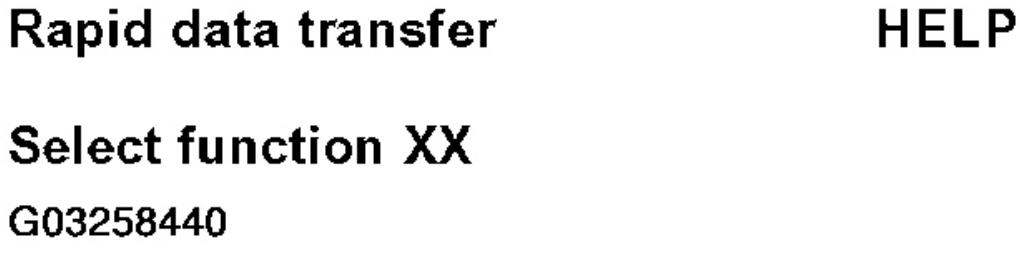


Fig. 41: V.A.G 1551 Scan Tool Display - Checking EVAP Canister Purge Regulator Valve (1 Of 4)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Press buttons -0- and -8- for "Read measured value block" function and confirm entry with -Q-button.

Indicated on display

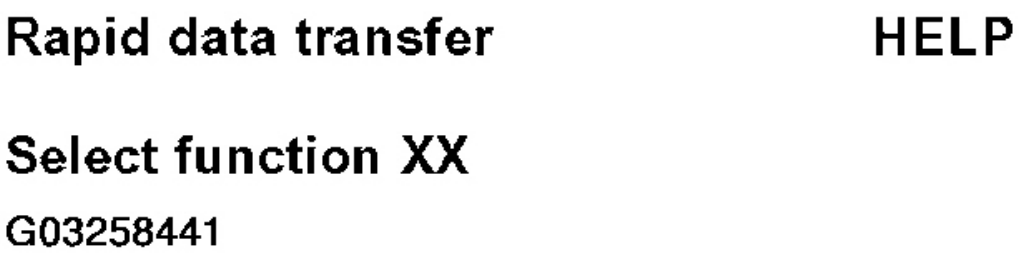


Fig. 42: V.A.G 1551 Scan Tool Display - Checking EVAP Canister Purge Regulator Valve (2 Of 4)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Press buttons -0-, -7- and -0- for "Display group number 70" and confirm entry with -Q- button.

Indicated on display: (1-4 = Display zones)

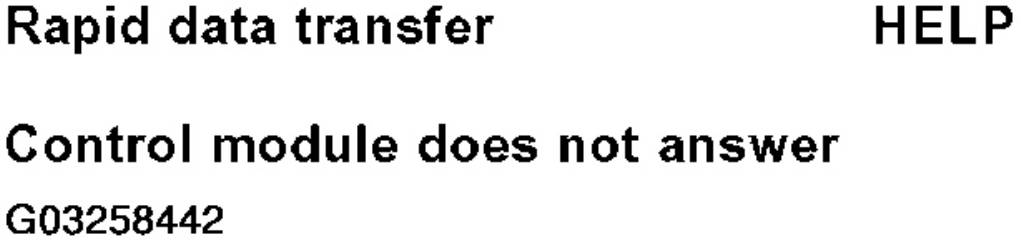


Fig. 43: V.A.G 1551 Scan Tool Display - Checking EVAP Canister Purge Regulator Valve (3 Of 4)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Press button -4- for "Basic setting" function ("Tank venting valve diagnosis" will be initiated)

NOTE: The engine must not be loaded during this diagnosis because the diagnosis will be interrupted and will not be started again until the engine is revved-up.

Indicated on display: (1-4 = Display zones)

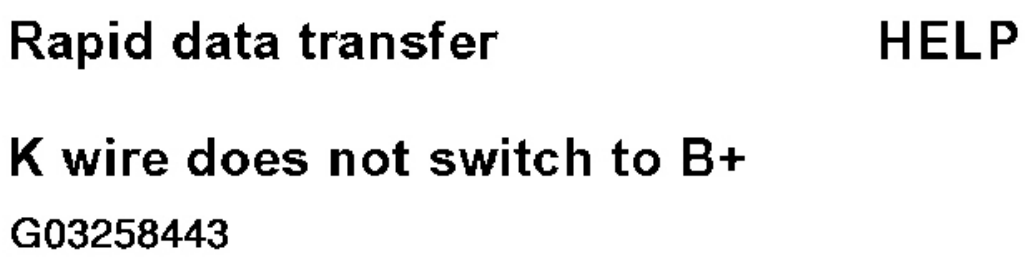


Fig. 44: V.A.G 1551 Scan Tool Display - Checking EVAP Canister Purge Regulator Valve (4 Of 4)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

When the diagnosis is initiated by the Engine Control Module, the display in display zone 4 jumps from "Test OFF" to "Test ON".

- Run engine at idling speed until specification "EVAP OK" is displayed in display zone 4.

NOTE: If the display jumps from "Test ON" to "Test OFF" during the test, rev up briefly and the test will be repeated.

DISPLAY JUMPS FROM "TEST ON" TO "TEST OFF"

-	Display zones			
	1	2	3	4
Display group 70: Evaporative Emission (EVAP) system diagnosis (tank venting system)				
Display	xxx. x %	xxx. x %	xxx %	Test OFF/Test ON EVAP(1) OK EVAP n.OK
Indicated	EVAP canister purge regulator valve opening during diagnosis	oxygen sensor control, Bank 1	EVAP canister purge regulator valve condition	Diagnosis condition and Diagnosis result
Working range	0.0-100.0%	-100.0-100.0%	0-199%	-
Specified value	-	-	-	EVAP OK.
(1) TEV means EVAP canister purge regulator valve.				

If "EVAP not OK" appears in display zone 4:

- Initiate output diagnostic test mode and activate EVAP Canister Purge Regulator Valve -N80-:

  See Output Diagnostic Test Mode (DTM), Initiating

- Check DTC memory.

  See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing

- Read readiness code.

  See Readiness Code, Displaying

  If DTC memory has been erased or Engine Control Module separated from permanent (battery) positive, readiness code must be generated again.

  See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing

  If the specification "EVAP OK" is obtained:

- Press --> button.
- Press buttons -0- and -6- for function "End output" and confirm entry with -Q- button.
- Switch ignition off.

EVAPORATIVE EMISSION (EVAP) SYSTEM, CHECKING FOR LEAKS

Special tools and equipment

- VAG 1551 Scan Tool

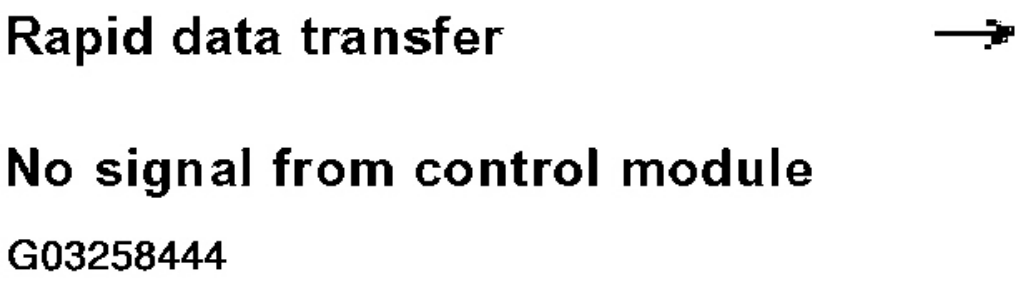


Fig. 45: Identifying VAG 1551 Scan Tool
Courtesy of VOLKSWAGEN OF AMERICA, INC.

NOTE: The VAG 1552 vehicle system tester can be used instead of the VAG 1551 Scan Tool, however a print-out is not possible.

- VAG 1551/3 Cable

Fig. 46: Identifying VAG 1551/3 Cable
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Test conditions

NOTE: Fuse box is located behind access panel at far left end of dash.

- Fuse No. 43 must be OK

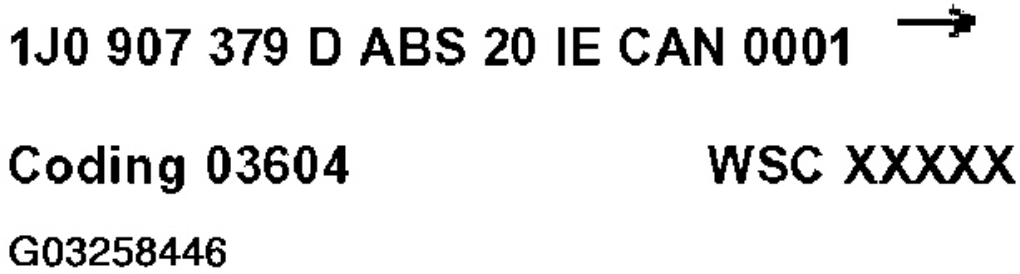


Fig. 47: Identifying Location Of Fuse No. 43
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- No malfunction stored in DTC memory

See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing

- All electrical consumers, e.g. lights and rear window defroster must be switched off
- If the vehicle is equipped with an air conditioner, this must be switched off
- Throttle valve angle less than 4.1%. See display group 03, display zone 3
- Coolant temperature less than 95° C. See display group 04, display zone 3
- Intake air temperature less than 90° C. See display group 04, display zone 4

Functional check

- Connect VAG 1551 Scan Tool (or VAG 1552 Scan Tool). Start engine and select Engine Control Module with "Address word" 01.

  Connecting scan tool and selecting Engine Control Module:

  See V.A.G 1551 Scan Tool, Connecting And Selecting Engine Control Module

  Indicated on display

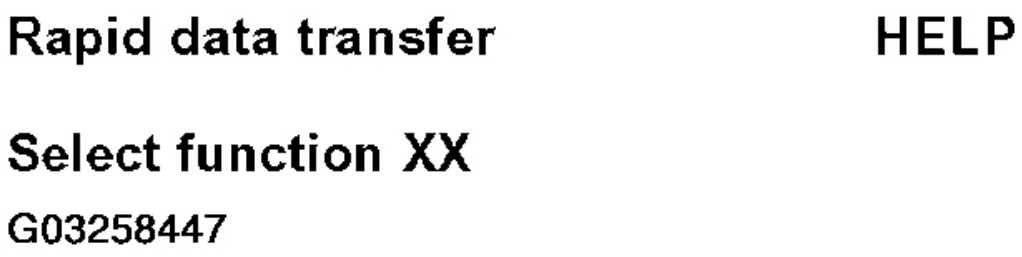


Fig. 48: V.A.G 1551 Scan Tool Display - Checking EVAP System For Leak (1 Of 4)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Press buttons -0- and -8- for function "Read Measuring Value Block" and confirm entry with -Q- button.

Indicated on display

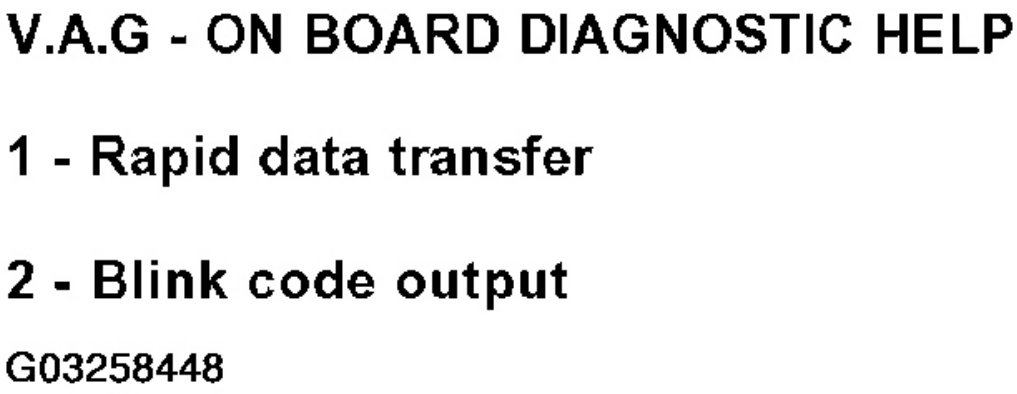


Fig. 49: V.A.G 1551 Scan Tool Display - Checking EVAP System For Leak (2 Of 4)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Press buttons -0-, -7- and -1- for "Display group number 71" and confirm entry with -Q- button.

  Indicated on display

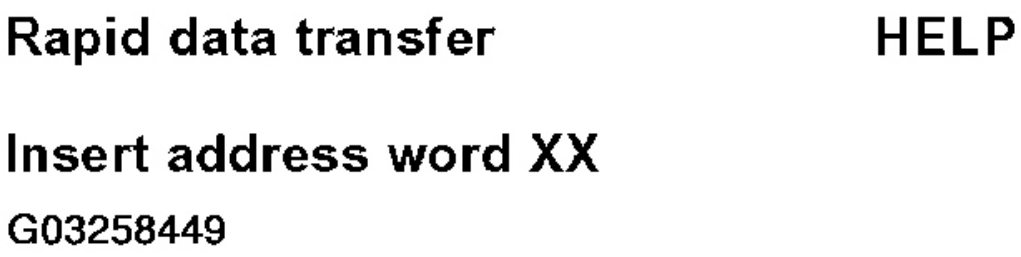


Fig. 50: V.A.G 1551 Scan Tool Display - Checking EVAP System For Leak (3 Of 4)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Indicated on display

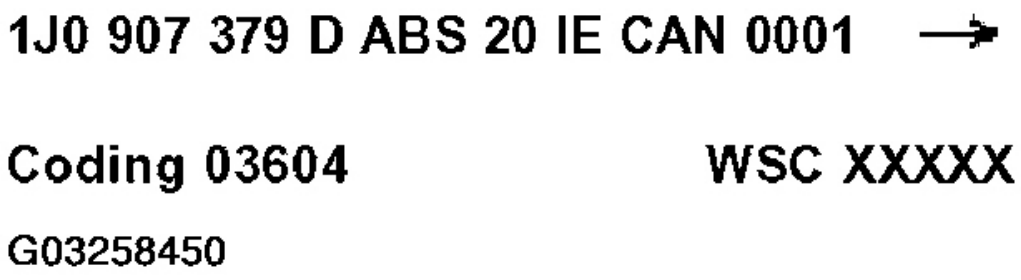


Fig. 51: V.A.G 1551 Scan Tool Display - Checking EVAP System For Leak (4 Of 4)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Check display in display zone 1:

DISPLAY IN DISPLAY ZONE CHECK

-	Display zones			
	1	2	3	4
Display group 71: Evaporative Emission (EVAP) system diagnosis (leak detection)				
Display	Reed open Reed closed	Small leak/large leak Abort	Syst. Test Check Check end	Test OFF/Test ON Syst. OK Syst. not OK
Indicated	Reed contact condition	Malfunction message	System condition	Diagnosis condition and diagnosis result
Working range	-	-	-	-
Specified value	Reed open	-	Check.END	Syst. OK

If "Reed open" appears in display group 1:

- Open fuel tank cap briefly to allow pressure in fuel tank to dissipate, this will close reed contact.

If the specification is obtained:

- Press button 4 for "Introduction of basic setting" function.

Indicated on display

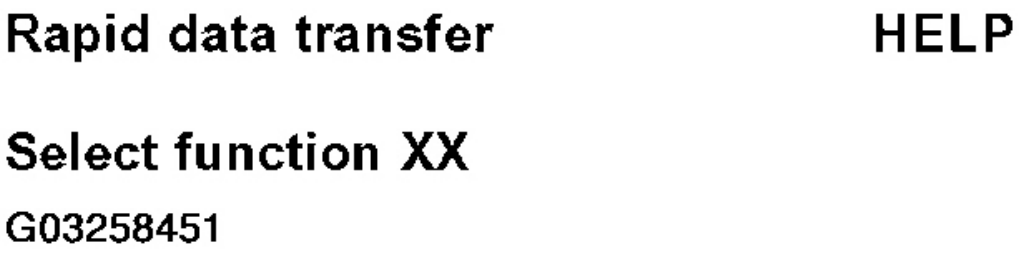


Fig. 52: V.A.G 1551 Scan Tool Display - Checking EVAP System For Leak (5 Of 11)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

The test of the Evaporative Emission (EVAP) system will be initiated. First of all the function of the Reed contact (in the Leak detection pump -V144-) will be checked by the control module.

After approx. 10 seconds the Leak Detection Pump (LDP) -V144- will be activated and build-up pressure in the fuel system.

Indicated on display

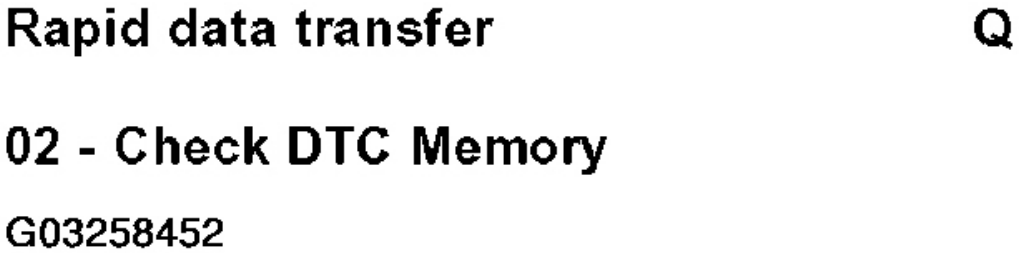


Fig. 53: V.A.G 1551 Scan Tool Display - Checking EVAP System For Leak (6 Of 11)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

The test will be initiated after approx. 50 seconds (when there is sufficient pressure available in the fuel system can last up to 120 seconds).

Indicated on display

Fig. 54: V.A.G 1551 Scan Tool Display - Checking EVAP System For Leak (7 Of 11)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

The Leak detection pump V144- switches off and the control module measures the time until the reed contact closes.

Indicated on display

Fig. 55: V.A.G 1551 Scan Tool Display - Checking EVAP System For Leak (8 Of 11)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Check display in display zones 3 and 4: specified value display field 3: Check. END Specified value display field 4: Syst. OK

DISPLAY IN DISPLAY ZONE CHECK

-	**Display zones**			
	1	2	3	4
Display group 71: Diagnosis of Evaporative Emission (EVAP) system (leak detection)				
Display	Reed closed Reed open	Small leak/large leak Abort	Syst. Test Check Check end	Test OFF/Test ON Syst. OK Syst. not OK
Indicated	Condition Reed contact	Malfunction message	System condition	Result
Working range	-	-	-	-
Specified	Reed open	-	**Messg. END**	**Syst. OK**

value	If a malfunction message is indicated: See **CHECKING FOR LEAKS** checking for leaks	If the specifications are not obtained: Check DTC memory, See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing

If the specifications are obtained:

- Press --> button.
- Press buttons -0- and -6- for function "End output" and confirm entry with -Q- button.
- Switch ignition off.

If the specifications are not attained:

- Press buttons -0- and -8- for "Read Measuring Value Block" function and confirm entry with Q button.

Indicated on display

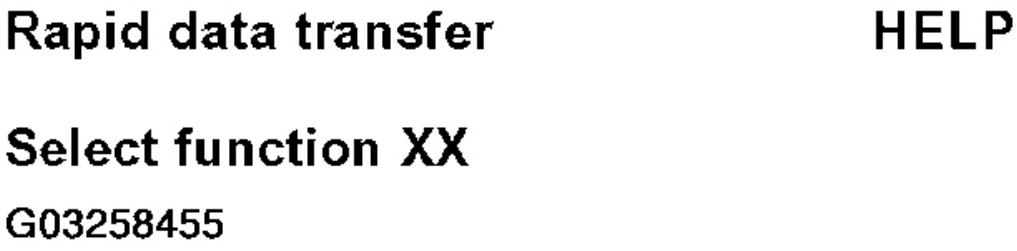
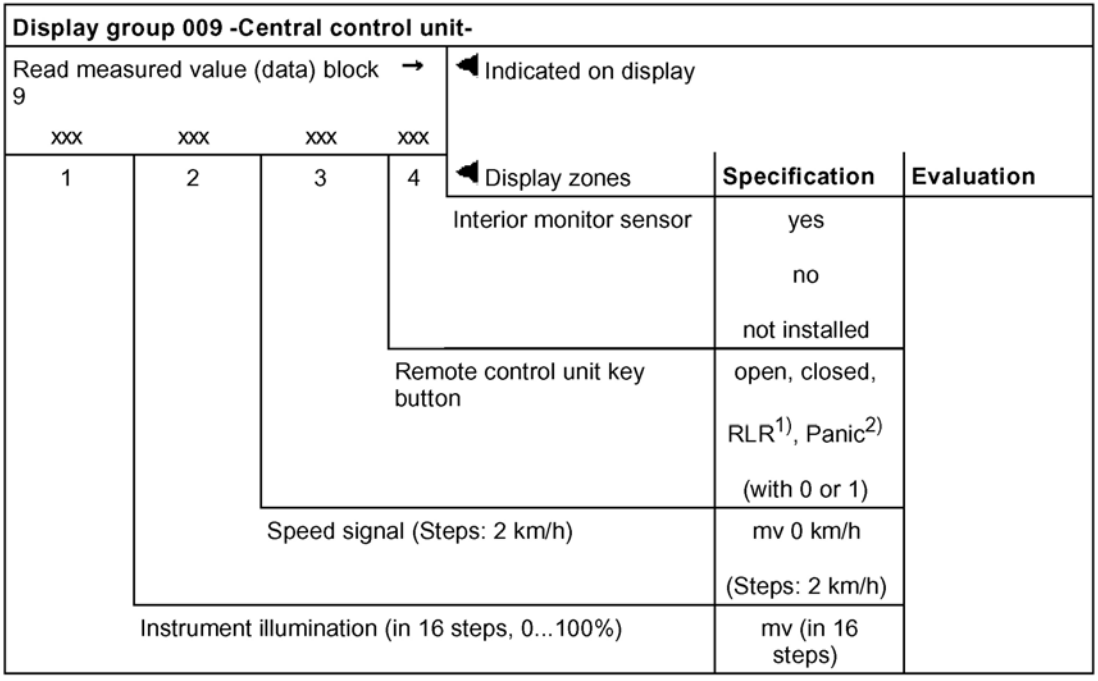


Fig. 56: V.A.G 1551 Scan Tool Display - Checking EVAP System For Leak (9 Of 11)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Press buttons -0-, -7- and -0- for "Display group number 70" and confirm entry with -Q- button.

Indicated on display: (1-4 = Display zones)



Display group 009 -Central control unit-						
Read measured value (data) block → 9				◀ Indicated on display		
xxx	xxx	xxx	xxx			
1	2	3	4	◀ Display zones	**Specification**	**Evaluation**
				Interior monitor sensor	yes no not installed	
				Remote control unit key button	open, closed, RLR[1], Panic[2] (with 0 or 1)	
				Speed signal (Steps: 2 km/h)	mv 0 km/h (Steps: 2 km/h)	
				Instrument illumination (in 16 steps, 0...100%)	mv (in 16 steps)	

[1] RLR= Rear Lid Remote Release

[2] Only vehicles for USA, alarm system and turn signal lights are activated

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Fig. 57: V.A.G 1551 Scan Tool Display - Checking EVAP System For Leak (10 Of 11)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Press button -4- for "Basic setting" function ("Tank venting valve diagnosis" will be initiated).

NOTE: The engine must not be loaded during this diagnosis because the diagnosis will be interrupted and will not be started again until the engine is revved-up.

Indicated on display: (1-4 = Display zones)

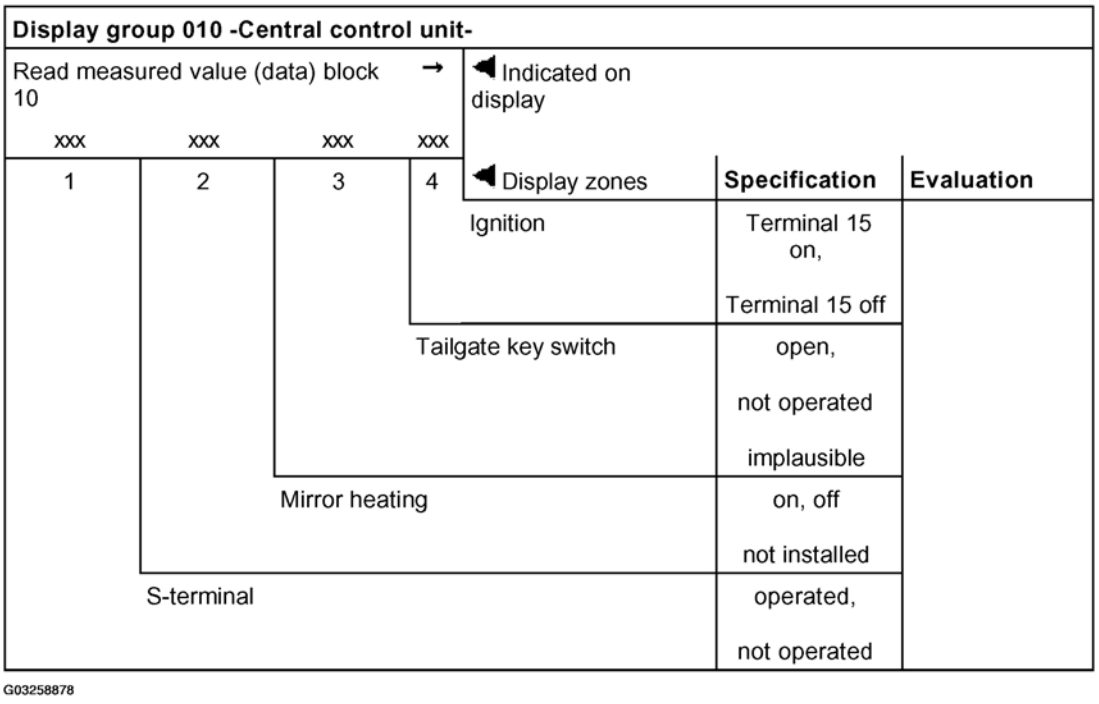

Fig. 58: V.A.G 1551 Scan Tool Display - Checking EVAP System For Leak (11 Of 11)
Courtesy of VOLKSWAGEN OF AMERICA, INC.

When the diagnosis is initiated by the Engine Control Module, the display in display zone 4 jumps from "Test OFF" to "Test ON."

- Run engine at idling speed until specification "EVAP OK" is displayed in display zone 4.

NOTE: If the display jumps from "Test ON" to "Test OFF" during the test, rev up briefly and the test will be repeated.

DISPLAY IN DISPLAY ZONE CHECK

-	Display zones			
	1	2	3	4
Display group 70: Evaporative Emission (EVAP) system diagnosis (tank venting system)				
Display	xxx.x %	xxx.x %	xxx %	Test OFF/Test ON EVAP(1) OK EVAP not OK
Indicated	Opening of EVAP canister purge regulator valve during diagnostic	oxygen sensor control value Bank 1	Condition of EVAP canister purge regulator valve (relative EVAP - specification)	Diagnostic condition and Diagnostic result
Working	0.0-100.0%	-100.0-100.0%	0-199%	-

range				
Specified value	-	-	-	EVAP OK.
(1) TEV means EVAP canister purge regulator valve				

If "EVAP n. OK" appears in display zone 4:

- Initiate output diagnostic test mode and activate EVAP Canister Purge Regulator Valve -N80-:

  See Output Diagnostic Test Mode (DTM), Initiating

- Read readiness code.

See Readiness Code, Displaying

If DTC memory has been erased or Engine Control Module separated from permanent (battery) positive, readiness code must be generated again.

See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing

If the specification "EVAP OK" is obtained:

- Press --> button.
- Press buttons -0- and -6- for function "End output" and confirm entry with -Q- button.
- Switch ignition off.

Checking for leaks

If a small or large leak is detected during the check of the Evaporative Emission (EVAP) system, proceed as follows.

- Switch ignition off.
- Check whether sealing cap of fuel tank is completely closed or whether sealing ring is leaking, replace if necessary.
- Repeat functional check.

Is the malfunction still present:

- Fold rear seat bench forward.
- Remove cover under seat bench.
- Check whether locking ring for fuel delivery unit is tight. It can be found under luggage compartment floor trim. Replace seal if it is malfunctioning.
- Tighten locking ring with special tool 3217.

- Check supply and return pipes on fuel delivery unit for leaks.
- Repeat functional check.

Is the malfunction still present:

- Remove rear right wheel housing liner.

  See **REAR WHEEL HOUSINGS LINER, ASSEMBLY OVERVIEW** .

- Check connecting pipes and hoses between Leak Detection Pump and EVAP canister. Replace if necessary. See **EVAPORATIVE EMISSION (EVAP) SYSTEM COMPONENTS, SERVICING** .
- Check wires and wire connections between EVAP canister and tank flap unit or tank ventilation valve for proper seal. See **EVAPORATIVE EMISSION (EVAP) SYSTEM, OVERVIEW** .
- Repeat functional check.

Is the malfunction still present:

- Remove EVAP canister and check for cracks and leaks, replace if necessary.
- Repeat functional check.

LEAK DETECTION PUMP (LDP) -V144-, CHECKING

Special tools and equipment

- VAG 1715 Multimeter
- VAG 1527 BLED test light
- VAG 1594 A Adapter set
- VAG 1598/22 Test box
- Wiring diagram

Display group 011 -Central control unit-						
Read measured value (data) block 11 →				◀ Indicated on display		
xxx	xxx	xxx	xxx			
1	2	3	4	◀ Display zones	**Specification**	**Evaluation**
				Empty[1)]		
				Sliding/tilting sunroof released[2)]	yes, no	
				Trunk lid/tailgate contact switch	open, closed	
				Hood contact switch	operated, not operated, not installed	

[1)] Empty means in this case: Display zone is blank

[2)] The central control unit transmits a switch-off delayed terminal 15 to the sliding roof control unit. The sliding/tilting roof can then still be operated from the point when the ignition is switched off until one of the front doors is opened.

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Fig. 59: Identifying Special Tools And Equipment
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Checking voltage supply

Test conditions

- Fuse No. 43 must be OK

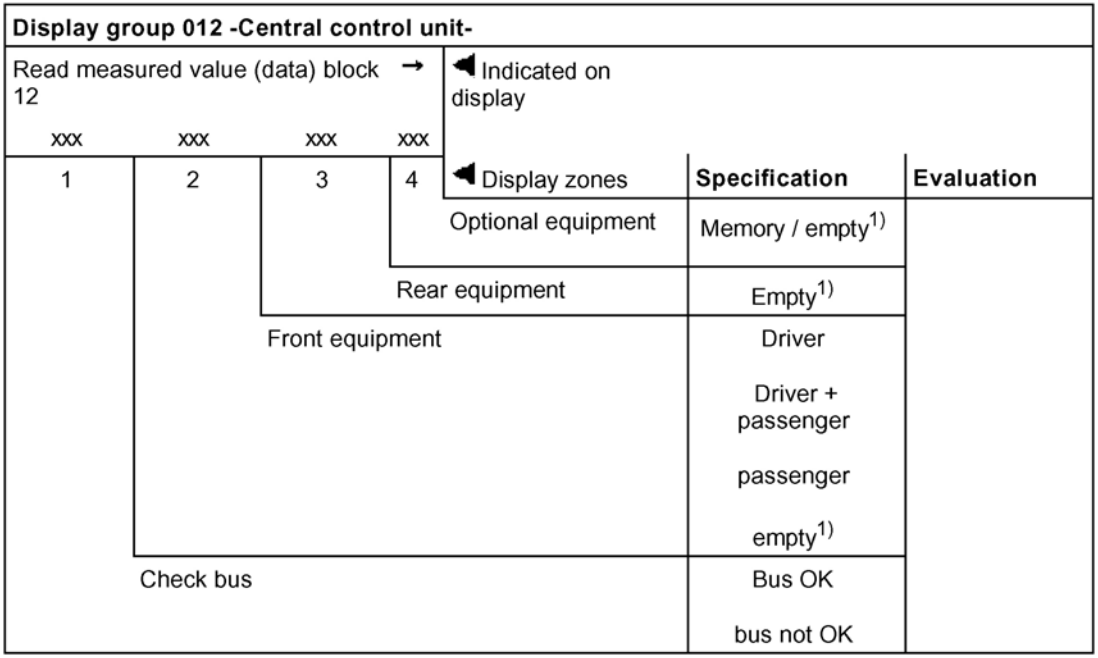


Fig. 60: Identifying Location Of Fuse No. 43
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- The battery voltage must be at least 11.5 V

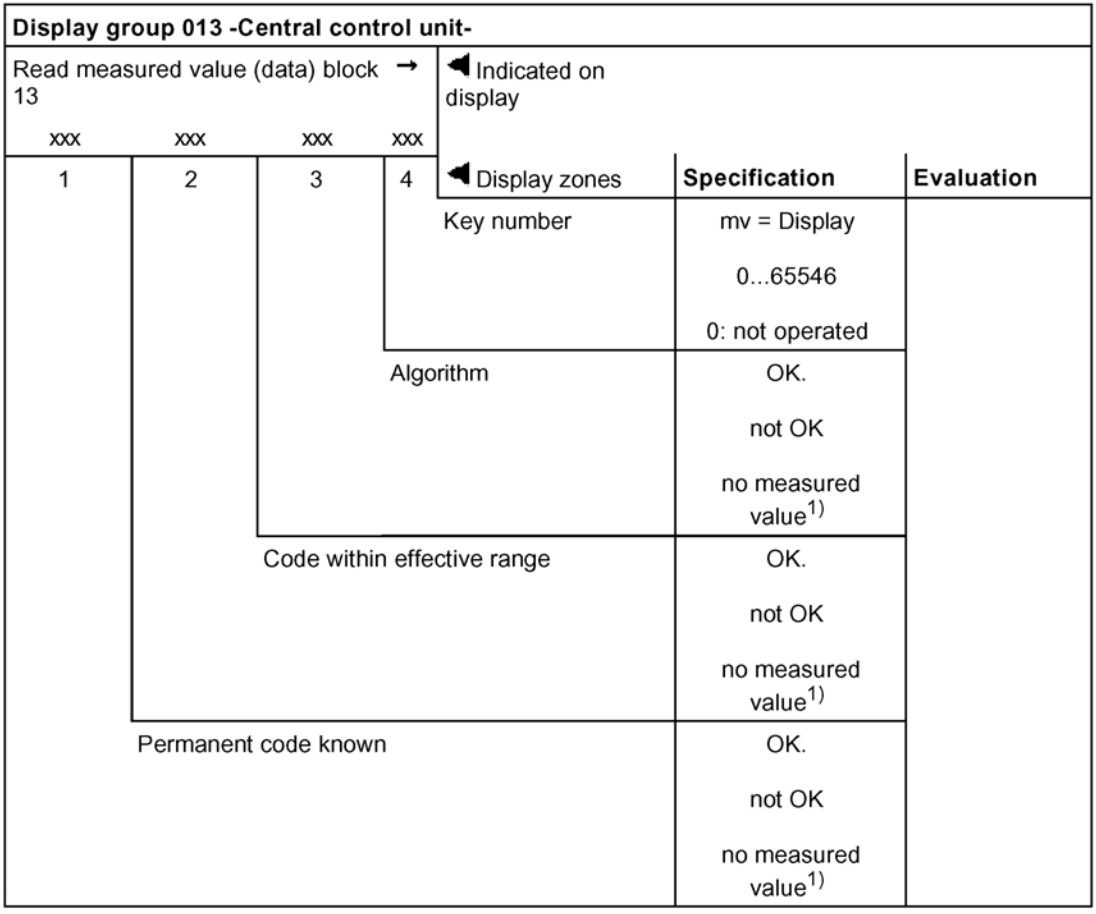
NOTE: Fuse box is located behind access panel at far left end of dash.

Test sequence

- Remove rear right wheel well liner.

  See **REAR WHEEL HOUSINGS LINER, ASSEMBLY OVERVIEW**

- Disconnect 3 pin connector from Leak Detection Pump -V144-.



Display group 013 -Central control unit-						
Read measured value (data) block → 13				◀ Indicated on display		
xxx	xxx	xxx	xxx			
1	2	3	4	◀ Display zones	**Specification**	**Evaluation**
				Key number	mv = Display 0...65546 0: not operated	
				Algorithm	OK. not OK no measured value[1)]	
				Code within effective range	OK. not OK no measured value[1)]	
				Permanent code known	OK. not OK no measured value[1)]	

[1)] If the remote control key is operated several times the third display - no measured value - will change to "OK".

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Fig. 61: Disconnecting 3 Pin Connector From Leak Detection Pump
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Connect LED test light VAG 1527 between connector terminal 3 (positive) and engine Ground.

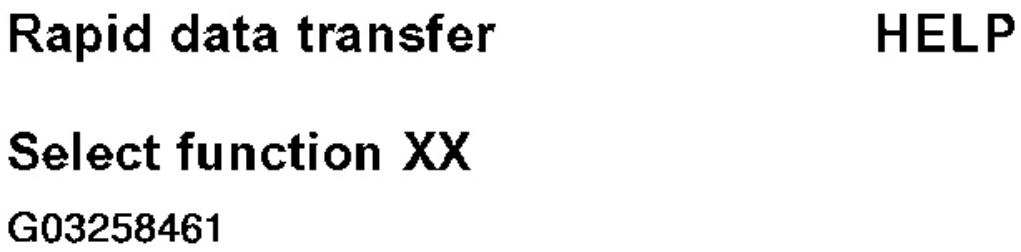

Fig. 62: Identifying Leak Detection Pump Connector Terminals
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Start engine and run at idling speed:

  LED must light up.

- Switch ignition off.

If the LED does not light up:

- Check wire for open circuit between 3 pin connector terminal 3 and relay plate using wiring diagram.

  Wire resistance: max. 1.5 ohm

LED lights up (voltage supply OK.):

- Remove inner plenum chamber cover, left.

  See **PLENUM CHAMBER INNER COVER, REMOVING AND INSTALLING**

- Connect test box VAG 1598/31 to control module wiring harness. Engine Control Module is not connected by this action.

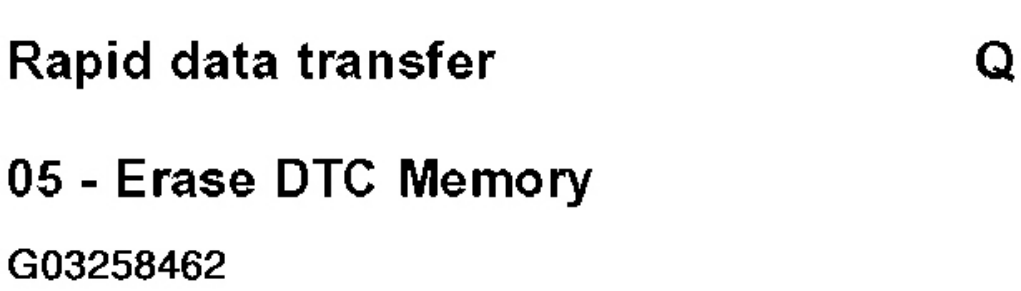

Fig. 63: Connecting Test Box VAG 1598/31 To Control Module Wiring Harness
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Check wiring between test box and 3 pin connector for open circuit using wiring diagram.

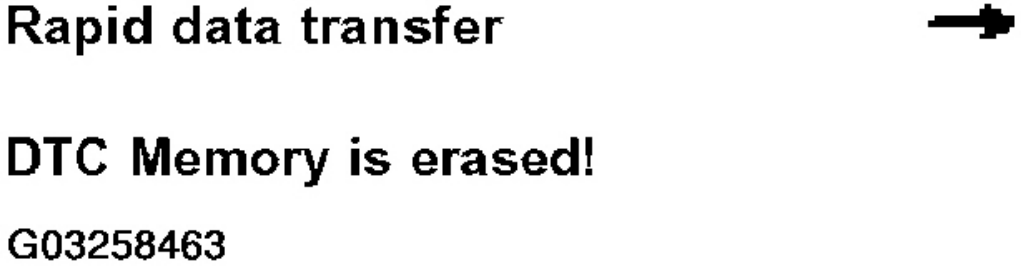

Fig. 64: Identifying Leak Detection Pump Connector Terminals
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Contact 1 + socket 80

Contact 2 + socket 25

Wire resistance: Max. 1.5 ohm

- Additionally, check wires for short to one another.

  Specification: infinite ohm

If no wiring malfunction is detected and voltage was present between contact 3 and Ground:

- Replace Leak Detection Pump -V144.
- Check DTC memory.

  See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing

- Read readiness code.

  See Readiness Code, Displaying

  If the DTC memory has been erased or the engine control module separated from permanent positive, the readiness code must be generated again.

  See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing

- Check wiring between test box and 3 pin connector for open circuit using wiring diagram.

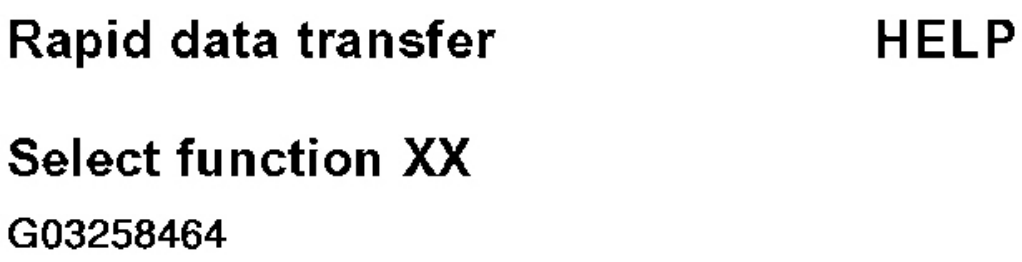

Fig. 65: Identifying Leak Detection Pump Connector Terminals
Courtesy of VOLKSWAGEN OF AMERICA, INC.

Contact 1 + socket 80

Contact 2 + socket 25

Wire resistance: Max. 1.5 ohm

- Additionally, check wires for short to one another.

  Specification: infinite ohm

If no wiring malfunction is detected and voltage was present between contacts 1 + 3:

- Replace Leak Detection Pump -V144-.

- Check DTC memory.

  See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing

- Read readiness code.

  See Readiness Code, Displaying

  If the DTC memory has been erased or the Engine Control Module separated from permanent positive, the readiness code must be generated again.

  See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing

Checking resistance

Test sequence

- Remove rear right wheel housing liner.

  See **REAR WHEEL HOUSINGS LINER, ASSEMBLY OVERVIEW**

- Disconnect 3-pin connector from Leak Detection Pump -V144-.

Fig. 66: Disconnecting 3-Pin Connector From Leak Detection Pump
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Connect hand multimeter VAG1526 to measure resistance between contacts 1 and 3 of -V144.

  Specification: 640-720 ohm

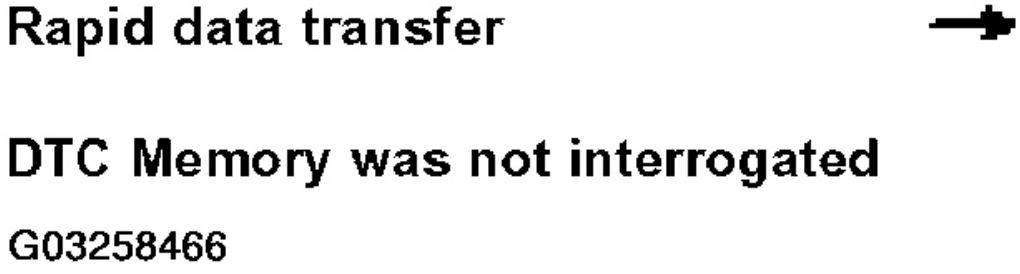

Fig. 67: Connecting Hand Multimeter Vag1526 To Measure Resistance Between Contacts 1 And 3 Of -V144
Courtesy of VOLKSWAGEN OF AMERICA, INC.

- Connect hand multimeter VAG1526 to measure resistance between contacts 2 and 3 of -V144 a specification of 17.5-27.5 ohm.

  Specification: 12.5 to 19.5 ohm

If the specifications are not attained:

- Replace Leak Detection Pump -V144-.
- Check DTC memory.

  See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing

- Read readiness code.

See Readiness Code, Displaying

If the DTC memory has been erased or the Engine Control Module separated from permanent (battery) positive, the readiness code must be generated again.

See Diagnostic Trouble Code (DTC) Memory, Checking And Erasing